



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 5, 2026 – 11:51 AM UTC

PDB ID : 4V05 / pdb_00004v05
Title : FGFR1 in complex with AZD4547.
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Deposited on : 2014-09-10
Resolution : 2.57 Å(reported)

This is a Full wwPDB X-ray Structure Validation Report for a publicly released PDB entry.

We welcome your comments at validation@mail.wwpdb.org

A user guide is available at

<https://www.wwpdb.org/validation/2017/XrayValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

The following versions of software and data (see [references ⓘ](#)) were used in the production of this report:

MolProbity : 4-5-2 with Phenix2.0
Mogul : 2022.3.0, CSD as543be (2022)
Xtriage (Phenix) : 2.0
EDS : 3.0
Buster-report : wwPDB partial adaption of 1.1.7 (2018)
Percentile statistics : 20250101.v01 (using entries in the PDB archive January 1st 2025)
CCP4 : 9.0.010 (Gargrove)
Density-Fitness : 1.0.12
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.49

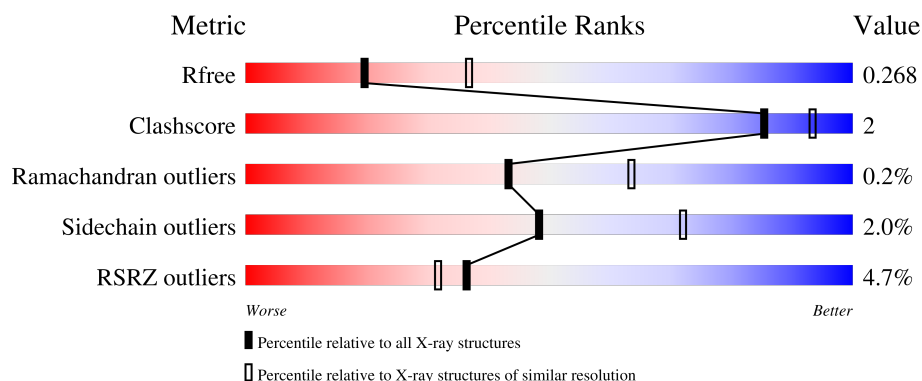
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.57 Å.

Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.



Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	180053	4770 (2.60-2.56)
Clashscore	190562	5124 (2.60-2.56)
Ramachandran outliers	187476	5046 (2.60-2.56)
Sidechain outliers	187428	5046 (2.60-2.56)
RSRZ outliers	180081	4770 (2.60-2.56)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments of the lower bar indicate the fraction of residues that contain outliers for ≥ 3 , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions $\leq 5\%$. The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density. The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	309	
1	B	309	

2 Entry composition [i](#)

There are 5 unique types of molecules in this entry. The entry contains 4756 atoms, of which 66 are hydrogens and 0 are deuteriums.

In the tables below, the ZeroOcc column contains the number of atoms modelled with zero occupancy, the AltConf column contains the number of residues with at least one atom in alternate conformation and the Trace column contains the number of residues modelled with at most 2 atoms.

- Molecule 1 is a protein called FIBROBLAST GROWTH FACTOR RECEPTOR 1 (FMS-RELATED TYROSINE KINASE 2, PFEIFFER SYNDROME), ISOFORM CRA_B.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	287	Total	C	N	O	S	0	4	0
			2230	1423	383	405	19			
1	B	286	Total	C	N	O	S	0	1	0
			2209	1412	377	403	17			

There are 6 discrepancies between the modelled and reference sequences:

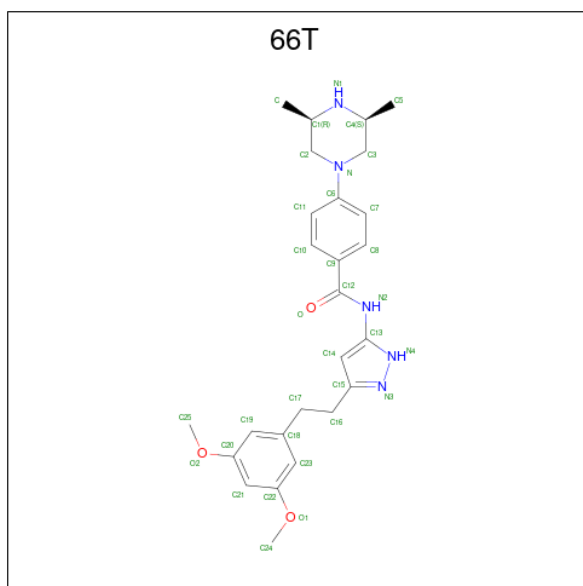
Chain	Residue	Modelled	Actual	Comment	Reference
A	457	GLY	-	expression tag	UNP D3DSX2
A	488	ALA	CYS	conflict	UNP D3DSX2
A	584	SER	CYS	conflict	UNP D3DSX2
B	457	GLY	-	expression tag	UNP D3DSX2
B	488	ALA	CYS	conflict	UNP D3DSX2
B	584	SER	CYS	conflict	UNP D3DSX2

- Molecule 2 is 1,2-ETHANEDIOL (CCD ID: EDO) (formula: C₂H₆O₂).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
2	A	1	Total C O 4 2 2	0	0
2	A	1	Total C O 4 2 2	0	0
2	A	1	Total C O 4 2 2	0	0
2	B	1	Total C O 4 2 2	0	0
2	B	1	Total C O 4 2 2	0	0

- Molecule 3 is N-{3-[2-(3,5-dimethoxyphenyl)ethyl]-1H-pyrazol-5-yl}-4-[(3R,5S)-3,5-dimethyl piperazin-1-yl]benzamide (CCD ID: 66T) (formula: C₂₆H₃₃N₅O₃).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	A	1	Total C H N O 67 26 33 5 3	0	0
3	B	1	Total C H N O 67 26 33 5 3	33	0

- Molecule 4 is SULFATE ION (CCD ID: SO4) (formula: O₄S).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
4	A	1	Total	O	S	0	0
			5	4	1		
4	A	1	Total	O	S	0	0
			5	4	1		
4	A	1	Total	O	S	0	0
			5	4	1		
4	B	1	Total	O	S	0	0
			5	4	1		

- Molecule 5 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	A	78	Total	O	0	0
			78	78		
5	B	65	Total	O	0	0
			65	65		

4 Data and refinement statistics

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants a, b, c, α , β , γ	208.78Å 57.48Å 65.58Å 90.00° 107.64° 90.00°	Depositor
Resolution (Å)	28.41 – 2.57 28.41 – 2.57	Depositor EDS
% Data completeness (in resolution range)	95.6 (28.41-2.57) 95.8 (28.41-2.57)	Depositor EDS
R_{merge}	0.06	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	3.27 (at 2.57Å)	Xtriage
Refinement program	BUSTER 2.11.2	Depositor
R, R_{free}	0.192 , 0.256 0.208 , 0.268	Depositor DCC
R_{free} test set	1182 reflections (5.17%)	wwPDB-VP
Wilson B-factor (Å ²)	48.3	Xtriage
Anisotropy	0.673	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.32 , 65.2	EDS
L-test for twinning ²	$\langle L \rangle = 0.51$, $\langle L^2 \rangle = 0.34$	Xtriage
Estimated twinning fraction	0.010 for -h-2*1,-k,l	Xtriage
F_o, F_c correlation	0.94	EDS
Total number of atoms	4756	wwPDB-VP
Average B, all atoms (Å ²)	55.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 6.95% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

²Theoretical values of $\langle |L| \rangle$, $\langle L^2 \rangle$ for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

5 Model quality

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: SO4, EDO, 66T

The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 5$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z >5	RMSZ	# Z >5
1	A	0.91	0/2275	1.33	12/3084 (0.4%)
1	B	0.87	0/2255	1.38	8/3056 (0.3%)
All	All	0.89	0/4530	1.36	20/6140 (0.3%)

There are no bond length outliers.

All (20) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	684	TRP	CA-C-N	6.44	129.21	120.38
1	A	684	TRP	C-N-CA	6.44	129.21	120.38
1	A	543	ASN	N-CA-C	6.00	119.35	112.57
1	A	508	VAL	N-CA-CB	5.74	120.04	110.86
1	B	508	VAL	N-CA-CB	5.50	117.58	110.99
1	A	753	ASP	CA-CB-CG	5.44	118.04	112.60
1	A	610	GLY	CA-C-N	5.36	127.45	120.28
1	A	610	GLY	C-N-CA	5.36	127.45	120.28
1	A	686	PHE	CA-C-N	5.30	125.82	119.94
1	A	686	PHE	C-N-CA	5.30	125.82	119.94
1	B	739	ALA	CA-C-N	5.27	126.19	122.60
1	B	739	ALA	C-N-CA	5.27	126.19	122.60
1	B	603	CYS	CA-C-N	5.24	127.30	120.28
1	B	603	CYS	C-N-CA	5.24	127.30	120.28
1	A	735	ASP	CA-C-N	5.19	127.24	120.28
1	A	735	ASP	C-N-CA	5.19	127.24	120.28
1	B	674	ASP	CA-CB-CG	5.12	117.72	112.60
1	A	694	PHE	N-CA-C	5.11	118.77	112.54
1	B	573	LEU	CA-C-N	5.06	127.37	120.54
1	B	573	LEU	C-N-CA	5.06	127.37	120.54

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry-related clashes.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	2230	0	2172	12	0
1	B	2209	0	2154	8	0
2	A	12	0	18	1	0
2	B	8	0	12	0	0
3	A	34	33	33	1	0
3	B	34	33	33	2	0
4	A	15	0	0	0	0
4	B	5	0	0	0	0
5	A	78	0	0	0	0
5	B	65	0	0	0	0
All	All	4690	66	4422	20	0

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 2.

All (20) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:564:ALA:H	3:A:1769:66T:HN4	1.44	0.65
1:B:564:ALA:H	3:B:1767:66T:HN4	1.44	0.65
1:A:754:LEU:O	1:A:758:VAL:HG23	2.05	0.56
1:B:754:LEU:O	1:B:758:VAL:HG23	2.06	0.55
1:B:514:LYS:HE2	1:B:528:LEU:HD13	1.92	0.51
1:B:474:PRO:HD2	1:B:477:ARG:HD3	1.91	0.51
1:A:551:CYS:HB2	1:A:558:TYR:HB2	1.95	0.48
1:B:535[A]:MET:HE1	3:B:1767:66T:H24B	1.96	0.47
1:B:597:SER:O	1:B:601:VAL:HG23	2.14	0.47
1:A:540:LYS:NZ	1:A:547:LEU:O	2.46	0.47
1:A:504:LYS:HG3	1:A:506:ASN:H	1.80	0.47
1:A:516:LEU:HD11	1:A:525:LEU:HD13	1.98	0.46
1:A:747:PHE:O	1:A:751:VAL:HG23	2.17	0.44
1:B:747:PHE:O	1:B:751:VAL:HG23	2.17	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:746:THR:HB	2:A:1767:EDO:H12	1.99	0.43
1:B:671:ALA:HB1	1:B:677:TYR:CE2	2.53	0.43
1:A:597:SER:O	1:A:601:VAL:HG23	2.19	0.42
1:A:503:ASP:HA	1:A:504:LYS:HA	1.84	0.42
1:A:532:MET:HG2	1:A:536:LYS:HE3	2.02	0.41
1:A:721:LYS:HE3	1:A:725:CYS:O	2.21	0.40

There are no symmetry-related clashes.

5.3 Torsion angles [i](#)

5.3.1 Protein backbone [i](#)

In the following table, the Percentiles column shows the percent Ramachandran outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

The Analysed column shows the number of residues for which the backbone conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	285/309 (92%)	279 (98%)	6 (2%)	0	100	100
1	B	279/309 (90%)	274 (98%)	4 (1%)	1 (0%)	30	49
All	All	564/618 (91%)	553 (98%)	10 (2%)	1 (0%)	43	63

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	499	GLY

5.3.2 Protein sidechains [i](#)

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

The Analysed column shows the number of residues for which the sidechain conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	228/269 (85%)	220 (96%)	8 (4%)	32	57
1	B	228/269 (85%)	227 (100%)	1 (0%)	84	92
All	All	456/538 (85%)	447 (98%)	9 (2%)	48	72

All (9) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	477	ARG
1	A	482	LYS
1	A	504	LYS
1	A	540	LYS
1	A	554	ASP
1	A	597	SER
1	A	609	ARG
1	A	618	LYS
1	B	711	LYS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (4) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	491	GLN
1	A	717	HIS
1	A	763	ASN
1	B	543	ASN

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

5.4 Non-standard residues in protein, DNA, RNA chains ⓘ

There are no non-standard protein/DNA/RNA residues in this entry.

5.5 Carbohydrates ⓘ

There are no oligosaccharides in this entry.

5.6 Ligand geometry

11 ligands are modelled in this entry.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\# Z > 2$	Counts	RMSZ	$\# Z > 2$
4	SO4	B	1768	-	4,4,4	0.25	0	6,6,6	0.36	0
4	SO4	A	1772	-	4,4,4	0.38	0	6,6,6	0.24	0
4	SO4	A	1770	-	4,4,4	0.25	0	6,6,6	0.22	0
4	SO4	A	1771	-	4,4,4	0.24	0	6,6,6	0.31	0
2	EDO	B	1765	-	3,3,3	0.59	0	2,2,2	0.20	0
3	66T	A	1769	-	37,37,37	0.47	0	48,51,51	0.53	0
3	66T	B	1767	-	37,37,37	0.46	0	48,51,51	0.54	0
2	EDO	A	1766	-	3,3,3	0.51	0	2,2,2	0.35	0
2	EDO	B	1766	-	3,3,3	0.40	0	2,2,2	0.43	0
2	EDO	A	1768	-	3,3,3	0.47	0	2,2,2	0.32	0
2	EDO	A	1767	-	3,3,3	0.65	0	2,2,2	0.12	0

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	EDO	B	1765	-	-	0/1/1/1	-
3	66T	A	1769	-	-	2/21/33/33	0/4/4/4
3	66T	B	1767	-	-	6/21/33/33	0/4/4/4
2	EDO	A	1766	-	-	0/1/1/1	-
2	EDO	B	1766	-	-	0/1/1/1	-
2	EDO	A	1768	-	-	1/1/1/1	-
2	EDO	A	1767	-	-	1/1/1/1	-

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (10) torsion outliers are listed below:

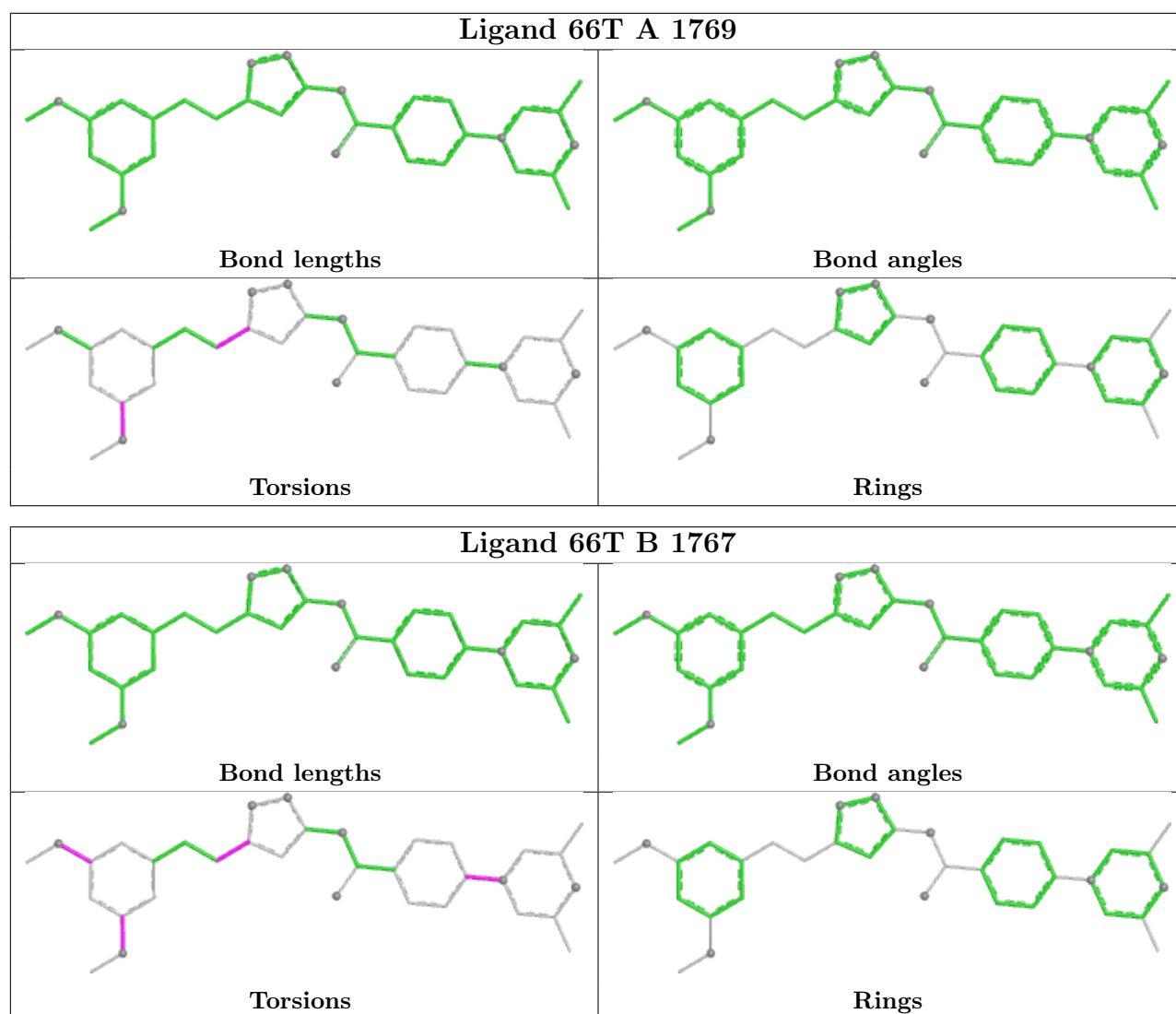
Mol	Chain	Res	Type	Atoms
3	B	1767	66T	C11-C6-N-C2
3	B	1767	66T	C7-C6-N-C2
3	B	1767	66T	C21-C20-O2-C25
3	B	1767	66T	C21-C22-O1-C24
3	A	1769	66T	C21-C20-O2-C25
3	B	1767	66T	C19-C20-O2-C25
2	A	1768	EDO	O1-C1-C2-O2
2	A	1767	EDO	O1-C1-C2-O2
3	A	1769	66T	N3-C15-C16-C17
3	B	1767	66T	N3-C15-C16-C17

There are no ring outliers.

3 monomers are involved in 4 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	A	1769	66T	1	0
3	B	1767	66T	2	0
2	A	1767	EDO	1	0

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less than 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.



5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

6 Fit of model and data

6.1 Protein, DNA and RNA chains

In the following table, the column labelled ‘#RSRZ > 2’ contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 95th percentile and maximum values of the occupancy-weighted average B-factor per residue. The column labelled ‘Q < 0.9’ lists the number of (and percentage) of residues with an average occupancy less than 0.9.

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å ²)	Q<0.9
1	A	287/309 (92%)	0.24	10 (3%) 47 42	17, 50, 83, 105	4 (1%)
1	B	286/309 (92%)	0.52	17 (5%) 28 24	23, 56, 87, 135	1 (0%)
All	All	573/618 (92%)	0.38	27 (4%) 36 32	17, 53, 86, 135	5 (0%)

All (27) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	580	GLY	3.8
1	B	501	ASP	3.7
1	B	644	LEU	3.6
1	B	654	TYR	3.4
1	B	505	PRO	3.4
1	B	677	TYR	3.2
1	A	646	ARG	3.1
1	B	653	TYR	2.9
1	B	463	TYR	2.9
1	A	518	SER	2.9
1	B	763	ASN	2.8
1	B	579	PRO	2.8
1	A	519	ASP	2.5
1	A	502	LYS	2.5
1	B	500	LEU	2.5
1	A	522	GLU	2.4
1	B	720	ASP	2.4
1	B	760	LEU	2.4
1	B	593	GLU	2.4
1	B	594	GLN	2.3
1	A	501	ASP	2.2
1	B	507	ARG	2.2
1	B	498	ILE	2.1
1	A	645	ALA	2.1

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Mol	Chain	Res	Type	RSRZ
1	B	649	HIS	2.1
1	A	504	LYS	2.0
1	A	594	GLN	2.0

6.2 Non-standard residues in protein, DNA, RNA chains [i](#)

There are no non-standard protein/DNA/RNA residues in this entry.

6.3 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

6.4 Ligands [i](#)

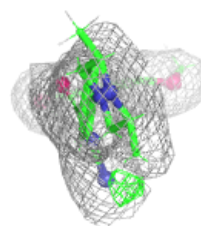
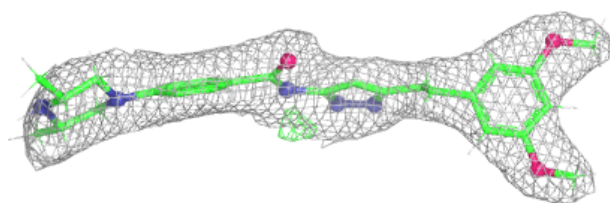
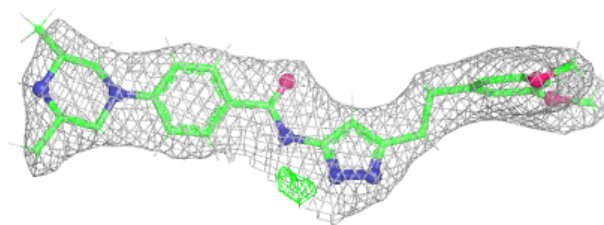
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
4	SO4	A	1771	5/5	0.83	0.12	100,101,104,104	0
2	EDO	B	1765	4/4	0.85	0.19	82,82,83,84	0
2	EDO	A	1768	4/4	0.86	0.14	64,64,66,67	0
4	SO4	A	1772	5/5	0.86	0.15	83,86,87,88	0
4	SO4	A	1770	5/5	0.87	0.12	98,100,101,102	0
3	66T	A	1769	34/34	0.91	0.10	34,42,70,74	0
3	66T	B	1767	34/34	0.92	0.10	36,48,83,87	33
2	EDO	B	1766	4/4	0.92	0.12	60,61,62,62	0
2	EDO	A	1766	4/4	0.93	0.13	42,43,49,57	0
2	EDO	A	1767	4/4	0.94	0.13	29,34,38,42	0
4	SO4	B	1768	5/5	0.94	0.10	77,78,79,82	0

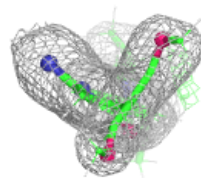
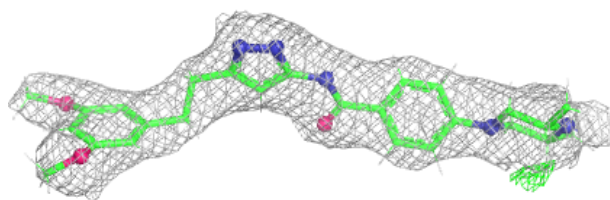
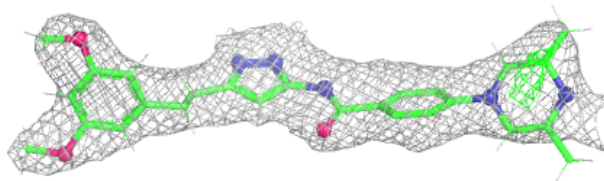
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation to approximate a three-dimensional view.

Electron density around 66T A 1769:

$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)

**Electron density around 66T B 1767:**

$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)



6.5 Other polymers [i](#)

There are no such residues in this entry.